

FINDINGS

RESOURCES AND ENVIRONMENT

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Regulating Ammonia Emissions From Hog Farms Would Raise Costs

Nitrogen from livestock waste can degrade both surface water (via runoff from cropland) and air quality (via emissions of ammonia from manure storage facilities and cropland). Nitrogen runoff is regulated, in part, by requiring large livestock operations to follow a nutrient management plan. Except in California, there are no regulations on ammonia emissions from animal feeding operations, even though livestock operations are the Nation's largest source of ammonia. A recent ERS study considers the economic and environmental implications of a hypothetical ammonia restriction for the U.S. hog industry. The study finds that the effects of the policy on costs and emissions would vary by region and by the type of manure storage system used.

Hog operations usually store manure in lagoons or pits. Their choice of storage facility has major consequences for the level of ammonia emissions. Lagoons are designed to reduce manure's nitrogen content through ammonia volatilization, which allows farmers to apply more manure on less land without exceeding crop nutrient requirements, thereby lowering manure transportation costs by eliminating the need to transport manure to more distant cropland. Lagoons tend to be more cost effective in relatively cropland-scarce regions, such as the South and Southeast. In contrast, pit manure facilities, which conserve manure nutrients for use on cropland, emit less ammonia and are more cost effective in cropland-abundant regions such as the Midwest.

In the current environment with no ammonia emission restrictions in place, ERS estimates that large operations using lagoons have ammonia emissions of twice as much per animal and almost three times as much in total compared with large operations using pit systems.

In a scenario requiring lower ammonia emissions using currently available ammonia-abatement technologies—lagoon covers and manure slurry injection—ERS finds that all large hog farms would face higher costs, but the restrictions would

Lagoon operations are more responsive to a hypothetical ammonia restriction than pit operations

	Ammonia nitrogen emissions with no restriction		Ammonia nitrogen emissions with hypothetical restriction	
	Per hundredweight hog produced	Total	Per hundredweight hog produced	Total
	Pounds	1,000 tons	Pounds	1,000 tons
Large lagoon operations				
Manure storage facility	7.9	281.1	4.1	144.2
Field	0.5	16.3	1.3	44.9
Total	8.4	297.4	5.3	189.0
Large pit operations				
Manure storage facility	3.3	79.9	3.3	79.9
Field	0.9	20.9	0.6	13.7
Total	4.2	100.9	3.9	93.7

Note: Large hog operations (at least 1,000 animal units) with lagoon operations are shown to emit substantially more ammonia per unit and in aggregate than large pit operations as measured by estimated levels of ammonia per unit (pounds of ammonia nitrogen per hundredweight of hog produced) and the total ammonia produced nationally (1,000 tons of ammonia nitrogen).

Source: Economic Research Service calculations calibrated with data from the 1998 USDA-ARMS Hogs Production Practices and Returns Report.

cause a greater decline in profits for lagoon operations than for pit operations (12 percent versus 2 percent). Lagoon operations, however, would see a 36-percent drop in ammonia emissions, compared with a 7-percent drop for pit operations. The geographic distribution of large lagoon and pit operations implies that farms in the South and Southeast would face greater declines in profits but would generate larger reductions in air pollution than farms in the Midwest. **W**

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This finding is drawn from . . .

Managing Manure To Improve Air and Water Quality, by Marcel Aillery, Noel Gollehon, Robert Johansson, Jonathan Kaplan, Nigel Key, and Marc Ribaud, ERR-9, USDA, Economic Research Service, September 2005, available at: www.ers.usda.gov/publications/err9/